TAIS MANAGES COMPLEXITIES OF THIRD DIMENSION FIGHT

Supporting The Force

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Introduction

It was the 7th inning as the San Francisco Giants faced the Arizona Diamondbacks on March 24, 2001, with their future Hall of Famer Randy Johnson on the mound. He released his blistering 95-mph fastball, and as the projectile crossed home plate, something unexpected happened. The fans, players, and umpires alike were mesmerized and shocked by the explosion of feathers at home plate as a flight of two doves crossed that lethal point of airspace at precisely the time of Johnson's deadly accurate pitch.

It wasn't planned. Most would say it was statistically impossible; yet it happened, providing a stark illustration of the high risk of operations in the third dimension of the battlespace. The flight of doves could have been a flight of Apaches. The baseball could have been a 155mm round, and the results would have been even more horrific. It happened over home plate, but it can happen over Pristina, Jalalabad, or anywhere America's sons and daughters are in harm's way.

The wartime problem of two flying objects (at least one being an aircraft) attempting to occupy the same space at the same time has existed since the implementation of the manned balloon as an aerial artillery observation platform. By the end of the 20th century, during Operations Desert Shield and Desert Storm, the U.S. military had developed procedures and documents to help alleviate the problem—the use of the Air Tasking Order (ATO) and the Airspace Control Order (ACO).

ATO And ACO

The ATO and ACO are large documents created to support the missions of the next air operation. These missions often involve cruise missiles and hundreds of aircraft, both manned and unmanned, from many nations. The ATO and ACO are designed to facilitate freedom of action in the third dimension of the battlespace to accomplish the joint force commander's intent and to minimize the potential for aircraft to unwittingly meet other airspace users "over home plate."

During Operation Desert Storm, these documents needed to be distributed rapidly and daily to many places across a 2,000-kilometer front. After the war, the Army concluded it must do a better job of receiving and disseminating the ATO/ACO, and must be able to do it digitally. Subsequently, the Army Aviation Center at Fort Rucker, AL, wrote the requirement for a system that will enable Army airspace managers to effectively and efficiently manage the use of airspace over the battlefield while minimizing the potential for fratricide. The new system was designated as the Tactical Airspace Integration System (TAIS). The Mission Needs Statement was approved in July 1993, and the Operational Requirements Document was approved in June 1995.

Development

The responsibility for materiel development of the TAIS was assigned to the Office of the Product Manager for Air Traffic Control Systems (PM, ATC) at Redstone Arsenal, AL. With no funds available for a new program in FYs 96 and 97, the program was scheduled to start in FY98. In mid-1996, however, the Army Aviation Center implored PM, ATC to accelerate the program so that the TAIS could participate in the Division XXI Advanced Warfighting Experiment (DAWE), scheduled to begin in July 1997 at Fort Hood, TX.

With little time and no research and development funds, the PM, ATC restructured the "spend plan" to initiate the program. The acquisition strategy was to create the TAIS as a nondevelopmental item. A market survey found four potential candidate systems. With the urgency to "get on contract" as soon as possible, an intensive effort was made to "piggyback" the TAIS within the scope of an existing contract. The result was to procure and modify two Joint Surveillance Target Attack Radar System (JSTARS) Common Ground Station shelters and to integrate additional off-the-shelf software. A modification of the JSTARS contract was made in January 1997, and the first TAIS (a prototype) was delivered to Fort Hood in June 1997, in time to participate in the DAWE.

In October 1998, a General Officer Steering Committee directed that the TAIS be acknowledged as the U.S. Army's digitized system to support the Army Airspace Command and Control (A2C2) mission. Shortly thereafter, in January 1999, the Army officially recognized the TAIS as a principle component of the Army Battle Command System (ABCS).

Capabilities

Deconflicting airspace and the users of that airspace to prevent fratricide, while concurrently ensuring freedom of action in the third dimension, is one of the key capabilities provided to warfighters by the TAIS. The system supports warfighters by automating A2C2 planning and operations functions as well as Air Traffic Services (ATS) tasks. It helps planners to build Army input for the joint ACO, to digitally disseminate the approved A2C2 overlay, and to electronically distribute the approved joint ACO to Army forces when received from the Airspace Control Authority (ACA) and the Joint Force Air Component Commander (JFACC).

The TAIS can display airspace control measures in two or three dimensions while monitoring the real-time airspace situation, giving commanders and their staffs situational awareness and the ability to visualize the airspace in ways never before possible. As an

ABCS Battlefield Automation System (BAS), the TAIS is interoperable with all other ABCS BASs and the U.S. Air Force Theater Battle Management Core System, providing a direct link to the JFACC/ACA.

The enthusiastic reception of the system by warfighters and the tactical ATC community is a direct byproduct of soldier involvement. Soldiers have identified many improvements in TAIS functionality. The inclusion of soldiers in the design and spiral development process has been a principle factor in the successful evolution of the TAIS and its widespread acceptance. TAIS has been an active participant in testing and development of ABCS common software. The TAIS underwent final acceptance testing and the government officially accepted system No. 1 on Aug. 10, 2000, from the prime contractor, General Dynamics Decision Systems (formerly Motorola Systems Support Group).

Equipment

The "full" TAIS, the AN/TSQ-221, is comprised of two High Mobility Multipurpose Wheeled Vehicles (HMMWVs)—Model M1113, Expanded Capacity Vehicles—two standard Army rigid-wall shelters containing the mission equipment package (MEP), two soft-sided shelter extensions, and two cargo HMMWVs. The prime power source is the Tactical Quiet Generator, 15-kilowatt power unit, Model PU-801. The MEP consists of the necessary computers, communication equipment, interfaces, and peripherals required to support automated A2C2 and ATS operations. The full TAIS is fielded to the en route platoons of ATS companies worldwide in direct support of division, corps, and echelon above corps headquarters. Six TAIS have been fielded to date, with a total of 31 systems to be fielded through FY08.

A subcomponent of the full TAIS is the TAIS Airspace Workstation (AWS). This integrated computer system comes in both a ruggedized, militarized version (green box) and a commercial off-the-shelf (white box) version. It is specifically designed for command, control, communications, computers, and intelligence (C4I) functions to support mission assessment, planning, and execution with tactical displays, integrated information management systems, operational communication decision aids, and planning aids. The TAIS AWS is designed to be fielded to elements that do not require the robust communication capabilities of the HMMWV-based full TAIS, such as battlefield coordination detachments, combat training centers, schoolhouses, and some echelon above corps-level commands.

Software

The TAIS software provides Army airspace managers with a powerful tool for accomplishing their missions. The ability to digitally receive and display airspace requests, automatically identify airspace conflicts, and digitally pass the Army requests to the JFACC or ACA provides tremendous reduction of workload over the previous manual procedures and greatly reduces the possibility of human error. Soldiers in the field have reported more than a tenfold reduction of processing time for these requests from the old way of doing business.

One of the most powerful and far-reaching additions to the latest version of TAIS software is a Web-based tool that permits any computer on a tactical local or wide area network to submit requests for airspace to TAIS. This Web interface allows not only Army elements without a TAIS workstation to submit requests, but also other Services, the Joint Forces Land Component Command, alliance and coalition forces, and other governmental and nongovernmental agencies.

Homeland Security

After the terrorist attacks in September 2001, the PM, ATC began examining how TAIS could contribute to the homeland security mission. Several missions and capabilities were identified. With ability to receive and display air-track information from the Federal Aviation Administration (FAA) and other source radars, TAIS can support airspace control operations in the event an FAA regional control center or airport control facility is disrupted or destroyed as the result of terrorist actions. It can also provide a CONUS interior point defense command and control capability for the National Airspace System, thus playing a key role in the management of airspace in the vicinity of potential terrorist targets such as airports, power plants, petroleum plants, or other sites in remote areas. A demonstration of these capabilities was conducted in February 2002 and validated the proof of concept for integrating TAIS capabilities with ground-based air defense assets to protect potential high-priority target sites.

Conclusion

The capabilities provided to the warfighter by TAIS are long overdue. The Army cannot afford to impede the application of combat power and possibly put mission accomplishment at risk because of inability to manage the airspace, and we certainly can't accept the loss of life and destruction of critical warfighting systems because of fratricide incidents in the third dimension of the battlespace. In that regard, much like the call to action embodied by the Korean War experience of "No more Task Force Smiths," TAIS exists to ensure that there are "No more Randy Johnsons!"

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